Water Management Plan Checklist

Ministry of Agriculture and Food

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This checklist is designed to help Qualified Professionals (QPs) prepare Water Management Plans for agricultural properties in B.C. It covers the essential aspects of sustainable water management planning necessary to support the adoption of beneficial management practices (BMPs) and to ensure compliance with relevant provincial, federal, and municipal regulations. As every agricultural operation is unique, some portions of the checklist may not apply, or additional information not included in this checklist may be required.

Please complete (i.e., check the boxes as applicable) and submit this checklist with your completed Water Management Plan under the Beneficial Management Practices (BMP) program (2902).

This checklist serves as guidance only.

What is a Water Management Plan?

A Water Management Plan (WMP) evaluates farm water supply and demand and provides recommendations for efficient and sustainable use of water. In addition, a review of water licensing requirements must be conducted to ensure adequate authorizations are in place for both current and projected future uses identified in the WMP.

Water uses that rely on irrigation systems such as frost protection, crop cooling and fertilizer injection, should also be identified in the WMP. Each activity should be assessed with respect to water licensing, system efficiency and other regulations (e.g., environmental protection).

Drainage water management can be an important component of a WMP and may include on-farm drainage systems as well as flood and runoff management. Assessment should cover on-farm subsurface drainage systems, berms and dikes, drainage ditches and channels, and outlets to natural water systems.

Water storage structures such as dugouts or rainwater harvesting systems are important infrastructure components of irrigation, frost protection, flood harvesting, crop washing, and drainage systems. These structures should be identified and assessed within the WMP to ensure that proper safety fencing is in place. The plan should detail current storage size and purpose, potential future expansion (new or existing storage), and assessment of storage outlets and overflow to the natural environment.

PART 1: FARM OPERATION OVERVIEW

1.1. Document the following farm property details:

- ☐ **Official farm name and physical address** of the farm.
- ☐ **Total acreage and associated property titles**.
- ☐ **Property legal description and Parcel Identifier(s) or Property Identification(s) (PID)** as they appear on the B.C. assessment notice. Use the BC Assessment online tool to search for property details.
- ☐ **Maps and/or site plans** showing the property boundaries, fields, power lines, pump locations, irrigation and drainage systems, dugouts or other water storage infrastructure and other key features pertinent to the WMP. This map or plan should be referenced when preparing the WMP.

1.2. Describe the farm operation, including but not limited to outlining and detailing the following:

- ☐ **Farming activities** (e.g., livestock, crop types, greenhouse operations) and **land area** for each activity.
- ☐ **Current irrigation methods and technologies used**.
- ☐ **All components of the farm drainage system,** including subsurface tile outlets, ditches, berms and pumps.
- ☐ **Water storage facilities on the farm, volume of water stored and what the water is used for.**

1.3. Indicate if an Environmental Farm Plan has been completed for the farm property in the past five years. If so, provide the date of completion.

- ☐ Yes. Date of Completion (DD/MM/YYYY): _____
- ☐ No

PART 2: EXISTING WATER SUPPLY

2.1. List all current water licences and associated details.
Use Water Licence Search and provincial GWELLS database.

- ☐ Licence number(s)
- ☐ Licensed volumes (annual maximum)
- ☐ Purpose of use(s)
- ☐ Time period of use(s)
- ☐ Peak flow rate or maximum withdrawal rate, if available
- ☐ Points of diversion
- ☐ Other

For surface water points of diversion, also include:

- ☐ Name of the source

For groundwater points of diversion, also include:

- ☐ Well tag number
- ☐ Well location (latitude and longitude)
- ☐ Well yield
- ☐ Well depth
- ☐ Well construction date

2.2. Water Supply Capacity.

- ☐ **Describe system specifications,** including pump specifications, flow rates and any relevant water quantity/quality test results.

PART 3: FARM WATER REQUIREMENT

3.1. Use the B.C. Agriculture Water Calculator to calculate current annual water requirements for applicable agricultural water use purposes.

- ☐ Irrigation
- ☐ Crop washing
- ☐ Flood harvesting
- ☐ Livestock watering
- ☐ Frost protection
- ☐ Domestic
- ☐ Other agricultural water use (please specify): _____

3.2. Evaluate current and future water requirements to ensure adequate licensing.
Check current water licences to ensure a sufficient licensed volume for current and future use is paramount. Include recommendations on additional licensing requirements, if applicable.

- ☐ **Use the Water Licence Search tool to compare calculated water requirements with current licensed volumes**. Verify that these volumes align, and if not, that any additional water licence applications for any remaining unlicensed volume have been made.
- ☐ **Calculate water volume needed to accommodate future water requirements** of any planned expansions or changes in operation that may increase water demand.
- ☐ **Identify if additional water licenses are needed** to support projected water use.

PART 4: IRRIGATION SYSTEMS

A WMP should outline possible irrigation system efficiency improvements. An irrigation schedule should be checked to ensure that the appropriate amount of water is being applied during irrigation. This will require evaluating irrigation system type, checking nozzles, sprinkler spacing, and pipeline sizes, and may include an assessment of the irrigation system power supply (see Part 11). Upgrading to a three-phase power supply may be warranted if pump horsepower is increased. Water quality used for irrigation may also need to be assessed as part of the WMP.

To cover the aforementioned irrigation system topics, ensure the following are included in the WMP:

- ☐ **Describe the types of irrigation systems** in use for each field (e.g., drip, centre pivot) and specify each irrigated field size, crops being grown, and soil texture.
- ☐ **Provide irrigation system specifications.** Include mainline sizing, operating pressure requirements, flow rates, pump requirements, pipe specifications, sprinkler/emitter details, etc.
- ☐ **Evaluate an irrigation schedule** by checking nozzles, sprinkler spacing and the irrigation interval to determine if an appropriate amount of water will be applied. Refer to Chapter 3 of the B.C. Irrigation Management Guide and Agricultural Irrigation Scheduling Calculator.
- ☐ **Determine if the irrigation water quality is suitable** for the intended crop. For crops eaten raw, potable water quality may be required, unless a crop washing facility is used. Refer to Chapter 11 of the B.C. Sprinkler Irrigation Manual.

PART 5: FERTILIZER INJECTION

Irrigation systems may be used to apply fertilizers and other chemicals to crops. Safety is the primary concern to ensure that chemicals are not inadvertently discharged to groundwater or surface water sources. **If applicable, include the following in the WMP:**

- ☐ **Describe the fertilizer injection system** and related equipment.
- ☐ **Address safety considerations** by confirming that an approved backflow preventer has been installed on the irrigation system. Further information can be found in Chemigation Guidelines for British Columbia and Cross Connection Control.

PART 6: LIVESTOCK WATERING

Identify and describe all water storage structures (e.g., dugouts) that are used to supply water for livestock.

- ☐ **Identify the water storage structures for livestock watering** on the site maps.
- ☐ **Describe the watering systems**. How is water supplied to livestock (e.g., gravity-fed, solar-powered, automatic, manual)?
- ☐ **Provide the annual, daily and/or seasonal water requirements for livestock**. Specify the numbers for each livestock type. Use the B.C. Agriculture Water Calculator.
- ☐ **Identify the different water sources** for each livestock system and confirm that there is sufficient water licensing in place.
- ☐ **Evaluate the water quality requirements for livestock.** See B.C. Livestock Watering Handbook.

PART 7: CROP WASHING

The volume of water used for crop washing may be small but should be identified. Crop washing has additional concerns, as used water cannot be discharged directly back to the environment due to residual chemicals (e.g., chlorine) in the wash water. Wash water should be stored and treated before being released or irrigated on one of the fields. **In the WMP, if crop washing is applicable:**

- ☐ **Provide an estimate of the annual water requirement** for crop washing.
- ☐ **Determine how the used water from the crop washing facility will be treated and discharged**.

PART 8: FROST PROTECTION AND CROP COOLING

Irrigation systems can also be used for frost protection and crop cooling. For **frost protection**, water is often stored in a storage facility to minimize the withdrawal rate from streams or ditches, as frost protection requires 10 times the flow rate of regular irrigation. The size of the storage facility should be assessed to determine if sufficient volume is available to provide 10 hours of frost protection. The amount of water that can be returned to storage and how much additional water is required after every frost event should also be determined. This additional water should be included in the volume of water licensed for the farm. **Crop cooling** during summer heat spells has become more prevalent as higher value crops are being produced. Cooling is usually required at the same time of season that irrigation needs are at the highest. Further information on frost protection and crop cooling can be found in the B.C. Frost Protection Guide and Chapter 9 of the B.C. Irrigation Management Guide. **In the WMP, if frost protection or crop cooling are applicable:**

- ☐ **Provide an estimate of the annual water requirement** for frost protection or crop cooling based on the number of anticipated frost or cooling events and the length of each event. Use the B.C. Agriculture Water Calculator (frost protection and crop cooling are selections available under the Irrigation tab).
- ☐ **Provide information on water supply sources as well as the storage facility size and location on the farm**. For frost protection, determine the amount of water that is returned to each event after a frost.

PART 9: FLOOD HARVESTING

Certain crops (i.e., cranberries) require flooding the field to harvest crops. Cranberry fields are usually broken into pods to reduce the amount of flood water required. Water may also be returned to storage or moved from one pod to another. The same storage facility that is used for frost protection is often used for flood harvesting. **In the WMP, if flood harvesting is applicable:**

- ☐ **Provide an estimate of the annual water requirement** used for flood harvesting based on the size of the pods and water lost when pumping from one pod to another or back to storage.

- ☐ **Provide information on water supply sources as well as the storage facility size and location**.

- ☐ **Evaluate the harvest and post-harvest water system** to ensure relevant regulatory requirements are met (e.g., water quality).

PART 10: WATER STORAGE FACILITIES

Farm water storage (e.g., dugouts) may be required for many activities on a farm including, but not limited to, irrigation, livestock watering, frost protection and crop harvesting. Refer to the Guidance on Farm Water Storage factsheet for more information. **In the WMP, if water storage is used:**

- ☐ **List and describe the type(s) of water storage facilities** and how many of each are present, as well as the purposes (e.g., irrigation, livestock, crop washing, flood harvesting, frost protection or other).

- ☐ **Describe and identify the specifications of each water storage facility**, including the dimensions, storage capacity, recharge time-period, lining, overflow system, etc.

- ☐ **Ensure that water storage facilities are adequately licensed** or that an appropriate licence is being (or has been) applied for.

PART 11: PUMPING SYSTEMS

Farm water management will often require one or more pumping systems. A WMP may identify pump efficiency improvements or increased pumping capacity to match new demand.

In the WMP:

- ☐ **Identify and describe pumping facilities**, including pump size (horsepower), location, type of pump and purpose of use.

- ☐ **Evaluate the power supply to each pump**. If pump horsepower needs to be increased, the power supply may need to change from a single phase to a three-phase supply, depending on pump size. Pumps larger than 7.5 kilowatts will often require a soft start motor or a three-phase electrical supply. See Chapter 9 of B.C. Sprinkler Irrigation Manual and Chapter 8 of B.C. Irrigation Management Guide.

PART 12: DRAINAGE AND STORMWATER MANAGEMENT

Drainage systems should be designed to the standards outlined in the B.C. Agricultural Drainage Manual. The evaluation of potential improvements to farm drainage may include subsurface tiles, ditches that convey water from the farm, and berms to prevent overland flow from entering the fields. In some cases, a sump and pump will be required. Where works may impact a stream, an application for changes in an about a stream may be required. Consult the Working Around Water webpage or FrontCounter BC (FCBC) at 1-877-855-3222, FrontCounterBC@gov.bc.ca, or through your nearest FCBC office (found here).

In the WMP, if drainage systems are applicable:

- ☐ **Map and description** of current drainage conditions, drainage infrastructure and its effectiveness.
- ☐ **Describe the main drainage channels**, including the grade, channel dimensions and construction specifications.
- ☐ **Identify and describe drain tile and blind inlet** locations and design specifications.
- ☐ **Identify and describe water control structure** locations and design specifications.
- ☐ **Assess drainage water quality** and potential impacts to the environment. Refer to Drainage Water Quality factsheet.

PART 13: ENVIRONMENTAL AND SOIL CONSIDERATIONS

Soil type and conditions are integral to irrigation and drainage design and management. Soil texture determines the maximum amount of water that can be applied by an irrigation system as well as the maximum application rate. For drainage, the soil texture will determine the spacing required by a subsurface drainage system. **Include the following considerations and assessments in the WMP, regarding:**

13.1. Soil characteristics and property topography, and how these may impact water management systems:

- ☐ **Identify soil texture classifications and their properties**. Use Soil Information Finder Tool (SIFT).
- ☐ **Check the performance of the irrigation and drainage systems** with respect to soil textures and depths.
- ☐ **Note any factors of berm and pond construction** that may affect construction or water management.
- ☐ **Describe property topography that may influence water management.** Identify elevation differences, slope and grade requirements. Use iMapBC.

13.2. Climate factors affecting water management planning and mitigation planning:

- ☐ **Document seasonal variations** in precipitation and runoff.
- ☐ **Consider long-term climate change impacts** that may affect water availability.
- ☐ **Develop mitigation strategies.** Plan measures to minimize negative environmental impacts.

PART 14: REGULATORY REQUIREMENTS

Document all regulatory requirements, compliance measures, and agency communications related to water management activities on the farm:

- ☐ **Confirm if any new water licences or licence amendments are needed** for surface or groundwater use.
- ☐ **Ensure compliance with provincial, federal, and municipal legislations** (e.g., Water Sustainability Act, Fisheries Act).
- ☐ **Document interactions and correspondences** with relevant agencies (e.g., permit applications, consultations).

PART 15: CURRENT ISSUES AND PROPOSED WATER MANAGEMENT PROJECTS

15.1. Identify and describe any <u>current</u> water management challenges affecting farm operations, related to the following.

- ☐ **Water supply issues** (e.g., shortage of water) and seasonal variations.
- ☐ **Irrigation problems** (e.g., pressure loss) and seasonal variations.
- ☐ **Drainage problems** (e.g., flooding, poor drainage or waterlogging, erosion) and seasonal variations.

15.2. Detail proposed improvements to address identified water management issues and enhance farm operations.

- ☐ Provide a comprehensive **overview of each proposed project** and describe how the improvements will address the issues in 2.1.

- ☐ Outline any plans to upgrade existing **water storage systems** or to install new systems to improve **water supply**.
- ☐ Outline any plans to upgrade existing **irrigation systems** or to install new systems to improve efficiency.
- ☐ Describe **planned drainage projects** (e.g., new channels, tile drainage). Refer to the technical information in the Drainage Management Guide.
- ☐ **Other Improvements:** Describe other areas of the farm that will benefit from enhancement.

15.3. Outline implementation timelines and budget considerations for proposed improvements.

- ☐ Outline **project schedules**, including planned start and completion dates and key milestones.
- ☐ Provide **financial planning information**, including estimated costs and potential funding sources.

15.4. Review and document regulatory requirements that may affect proposed improvements.

- ☐ Identify any **additional water licenses or license amendments** required to support the proposed improvements.
- ☐ If **changes in and about a stream** are required for installing works, such as connecting a drainage ditch to a stream, authorization may be required. Contact FrontCounter BC (FCBC) at 1-877-855-3222, FrontCounterBC@gov.bc.ca, or through your nearest FCBC office, found here.

PART 16: MONITORING AND MAINTENANCE

Develop and document a comprehensive monitoring and maintenance strategy to ensure ongoing system effectiveness:

- ☐ Establish procedures for regular **water use tracking and monitoring**. Use the B.C. Irrigation Water Use Calculator.
- ☐ **Define indicators for system performance** (e.g., crop yield, soil conditions).
- ☐ **Create a maintenance schedule**, outlining maintenance activities for infrastructure and water quantity/quality testing if applicable.
- ☐ **Assign responsibility** to team members or contractors regarding upkeep.

ATTACHMENTS CHECKLIST

Please ensure all applicable documents are attached in the WMP:

- ☐ Site Maps: Provide detailed current site layouts and proposed improvements.
  Use iMapBC or equivalent (PART 1 and 15).
- ☐ Soil Maps: Include soil types and relevant properties.
  Use Soil Information Finder Tool (SIFT) (PART 13).
- ☐ Water licences and Authorizations: Include current and pending applications (PART 2).
- ☐ Water Requirements: Attach detailed calculations (PART 3, 4, 5, 6, 7, 8 and 9).
- ☐ Correspondence with relevant regulatory agencies (PART 14).
- ☐ Technical Drawings or Schematics: Include designs for proposed works
  (e.g., irrigation layouts, drainage plans, construction specifications, design parameters) (PART 15).
- ☐ Environmental Assessments: Include any studies conducted (PART 13).
- ☐ Any additional supporting documents.